PERMIT me to remark that far from "ignoring" Messrs. Hall and Knight's use of the terms "Elementary" and "Higher" for the two parts of their Algebra, I have called special attention to it. It seems to me that the term "Higher Algebra" (*algèbre supérieure*) having been employed by Serret as embracing "the algebraic resolution of equations" in general, and that of "Modern Higher Algebra" by Salmon for what "with greater precision might be called the Algebra of Linear Transformations," it is hardly open to the writers of what is really a text-book of elementary algebra in two parts to apply the same term to the second part of their work, and to object to a gentle protest from a reviewer. I am at a loss to see where in my subsequent remarks I have practically ignored their own use of the terms.

I observed that "the fundamental laws of algebra are for the first time *gathered together* and discussed in the thirty-fourth chapter." This implies that they have *appeared dispersedly* in the book before, but the references in this chapter hardly justify the contention that they have appeared as "*the fundamental laws.*" In fact, the distinctive law of ordinary algebra that $ab = ba$, instead of being emphasized, is introduced as a fact "with which the student is familiar in arithmetic" ("Elementary Algebra," Art. 13), and nothing more said, as perhaps at this early stage might be expected. So again the "remainder theorem" does in fact appear in an article, *marked with an asterisk*, at the end of a chapter of "Miscellaneous Theorems" in the "Elementary Algebra," but only as an isolated proposition with a few exemplifications of its use. The point of my remark was that I should have expected such a fundamental theorem to be put in the forefront and largely made use of in the chapter on "Harder Factors." I would suggest this for the consideration of the authors in a future edition.

In like manner, as to my remark on the roots of equations involving radicals, the caution, which I regret that I overlooked in p. 99, appears only as a remark on one particular example, while nothing is said about it in the next, to which it is equally applicable, and in the answers at the end I find roots given which do not satisfy the equations as they stand. It is the practice of not requiring the pupil to select the signs suitable to each root, which I regretted to find that our authors in this way sanction.

Regard for your space prevents my adding more than the single remark that I regret that the practical commercial consideration of the cost of the first part of the book should have necessitated what I have regarded, and what, by urging this plea, the authors seem almost to admit, as, in itself, a "defect of plan." On reconsidering the matter for a future edition, the authors will, I cannot help thinking, find it possible, as it is desirable, to transfer so much from the second to the first part as will make the latter sufficient by itself, as at present it hardly is, for many pupils who need only a small portion of their higher part. R. B. H.

On the Constant P in Observations of Terrestrial Magnetism.

HAVING been absent from town, I have to-day for the first time seen the letters of Prof. Harkness and Mr. Ellis on the calculation of P.

Though unaware that it was used at Greenwich, or elsewhere, Dr. Thorpe and I have, for a year at least, employed the formula given by Mr. Ellis in the reduction of observations made for the magnetic survey. We have, in fact, made it still more accurate by the addition of another term. Thus, if we write l and l_1 for log A and log A_1, and μ for the modulus, it may easily be shown that—

$$P = \frac{r_1^2 r^2}{r_1^2 - r^2} \times \frac{l - l_1}{\mu} - \frac{r_1^2 r^2 (r_1^2 + r^2)}{2(r_1^2 - r^2)^2} \left(\frac{l - l_1}{\mu}\right)^2 \text{ nearly.}$$

Using the metric system of units and taking as is usual $r = 0·3$, $r_1 = 0·4$, this becomes—

$$P = 0·4737 (l - l_1) - 1·947 (l - l_1)^2.$$

The value of P for our first year's work calculated by the ordinary method is ·000817. Deduced from the formula given by Mr. Ellis it is ·000824, which the second term given above reduces to ·000818.

In this case the effect of the correction on the value of H is considerably below the error of experiment, but as attention has been drawn to the matter, it may be as well to point out that by means of the second term the accuracy of the approximation can be readily tested without the trouble of calculating P directly. ARTHUR W. RÜCKER.

September 21.

A Meteor's Flash and Explosion.

AT 8.52 p.m. (Dublin time) of yesterday, Tuesday, September 13, my wife and I while walking home were startled by a sudden bright flash like lightning, but slower and more regular in its movement. Simultaneously an intensely brilliant meteor shot majestically across the sky from north-north-west towards south-south-east, passing near, but to the eastward of, the zenith in its route. It seemed to take its origin from between the Pointers and the constellation Perseus, and died out at a height of 25° or 30° above the horizon.

Precisely three minutes and a half later a dull report was heard, which resembled that of a very distant field-gun, or of a peal of thunder far away, but it did not reverberate as thunder would have done.

It was impossible not to connect the phenomena of the flash and the report with each other. I accordingly made a rough calculation, which gave 43·4 miles as the distance—not necessarily vertical, but absolute—at which the meteor had become incandescent, and exploded, as a result of its collision with the earth's atmosphere. JOHN WILLIAM MOORE.

40 Fitzwilliam Square West, Dublin, September 14.

A Monstrous Foxglove.

MR. TENNANT in NATURE of September 22 (p. 482), after describing a curiously abnormal specimen of *Digitalis purpurea*, writes to ask if "such monstrous forms are at all usual." Thinking your correspondent may be unacquainted with Mr. Herbert Spencer's "Principles of Biology," I write to draw his attention to p. 226, vol. i. of that work, where, in speaking of some foxgloves growing in Derbyshire, Mr. Spencer says of one :—

"The following are the notes I took of its structure :—First or lowest flower on the stem, very large ; calyx containing eight divisions, one partly transformed into a corolla, and another transformed into a small bud with bract (this bud consisted of a five-cleft calyx, four sessile anthers, a pistil, and a rudimentary corolla) ; the corolla of the main flower, which was complete, contained six stamens, three of them bearing anthers, two others being flattened and coloured, and one rudimentary ; there was no pistil, but, *in place of it*, a large bud, consisting of a three-cleft calyx, of which two divisions were tinted at the ends, an imperfect corolla, marked internally with the usual purple spots and hairs, three anthers sessile on this mal-formed corolla, a pistil, a seed-vessel with ovules, and, growing to it, another bud of which the structure was indistinct. Second flower, large ; calyx of seven divisions, one being transformed into a bud with bract, but much smaller than the other ; corolla large, but cleft along the top ; six stamens with anthers, pistil, and seed-vessel. Third flower, large ; six-cleft calyx, cleft corolla, with six stamens, pistil, and seed-vessel, with a second pistil half unfolded at its apex. Fourth flower, large ; divided along the top, six stamens. Fifth flower, large ; corolla divided into three parts, six stamens. Sixth flower, large ; corolla cleft, calyx six-cleft, the rest of the flower normal. Seventh and all succeeding flowers normal." F. HOWARD COLLINS.

Churchfield, Edgbaston.

THE "UMBRIA'S" WAVE.

I HAVE been instructed by the Meteorological Council to send you the following report of the *Umbria's* wave from Capt. Watson, F.R.Met.Soc., who is General Superintendent of the Cunard Line of steamers.

HENRY TOYNBEE,
Marine Superintendent.

Meteorological Office, September 18.

MY DEAR CAPT. TOYNBEE,—I send you all the particulars I can get regarding the so-called "big wave" that struck the *Umbria*. No doubt there were some big waves knocking about the Atlantic on the morning of

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July 26, but nothing more than could, under the conditions of weather, be expected.

I cannot find out anything about other steamers meeting an exceptionally big wave.

Abstract of Log, s.s. "Umbria."

Date.	Wind.	Bar.	Air.	Water.	Remarks.
July 25.					
Noon	S.W.	29·60	62°	63°	Strong wind and overcast.
4 p.m.	W.S.W.	29·50	60	61	Fresh wind and showery.
8 p.m.	W. by N.	29·45	60	61	Fresh wind and clear.
Midnight	W. by N.	29·31	60	62	Moderate gale, force 9.
26th.					
4 a.m.	N.W. by W.	29·42	59	61	Moderate gale and squally, force 9.
8 a.m.	N.W. by W.	29·50	60	62	
Noon	N.W. by W.	29·70	59	62	

"4.40 a.m. Sea came on board over the bows, breaking No. 2 companion hatch, twisting the forward bridge, breaking some iron stanchions on the bridge, breaking the short bridge between the forward end of the promenade deck and the break of the forecastle, and bending the brass rails on the port side of the main upper bridge, leaving the lower bridge intact. 8 a.m. Fresh gale, force 9, with a heavy, confused sea. Noon. Gale moderating and the sea going down, but still confused."

So much from the log-book; but the following particulars are from the chief officer's report, and the statement of the second officer, who was in charge at the time the sea came on board.

At midnight on the 25th the wind was freshening from west by north, and the weather becoming squally. A long, heavy sea was coming from west-south-west, but the ship was only taking an occasional spray over all. At 2 a.m., 26th, the wind was west-north-west, a gale, with heavy and frequent squalls, sea rising fast from north-west. At 4, the wind had veered to north-west, with heavy and frequent squalls. At this time the west-south-west sea was still very heavy, with a high north-west sea running across and over it, making a very high and confused sea; but the ship was making 16 knots, and though the spray was flying fore and aft, she had not up to this time taken a drop of solid water on board.

At 4.40 a.m., lat. 50° 50′ N., long. 27° 8′ W., the officer of the watch noticed a heavy-breaking sea coming from the north-west; he ordered the officer at the engine telegraphs to reduce to "half speed," but before this could be done the top of this sea came on board, but did no damage. The ship rose quickly to it, but as this wave passed under the stern she plunged heavily, and dipping her bows into the second wave—not breaking, or as the officer of the watch expresses it, "dead water,"—scooped up a mass of water which, running aft over the break of the forecastle, fell upon No. 2 companion hatch, breaking it to pieces, also breaking the short bridge between the fore-end of the promenade deck and the break of the forecastle. The look-out bridge between the lighthouses was twisted, and five iron stanchions and 20 feet of the iron rails on it broken, and four brass stanchions on the port side of the upper main bridge were bent; the middle part of the topgallant forecastle deck for 40 feet in a fore-and-aft line, was sent down 2 inches by the weight of water passing over it. Some water got down No. 2 hatchway and frightened a few passengers.

The second officer is certain that the first sea did no damage, as only the top of it broke over the ship, but he describes the plunge the ship took, as this wave passed astern, as very heavy, and that she went bows into the solid water of the second wave, which he is quite certain was not breaking, but "coming smoothly along." This made the ship "stagger, and the sensation was as if she had struck something hard." After the sea came on board the speed was reduced to 10 knots, and was not increased till noon.

The canvas screen on the port side of the upper main bridge was spread, and the spray striking this bent the brass stanchions. The lower bridge escaped, through there being no canvas screen spread.

Although the wind was three points on the starboard bow, with a heavy sea from the same direction, it seems to me, from the brass stanchions on the upper main bridge having been bent aft and to starboard, and from certain marks on the forecastle deck, that the second officer's statement, as to the damage being done by the second wave (in my opinion the west-south-west sea, which was still running high and fast), is correct; and in my own experience I have seen, on more than one occasion, serious damage done by a sea coming up on the lee bow and breaking on board hours after the wind had been blowing three or four points on the other bow.

If we take into consideration a long and heavy sea from west-south-west, a north-west gale, and heavy sea from the same quarter, we shall have an ugly, confused sea. If a very powerful ship with very fine lines is driven at the rate of 16 knots through this confused sea, I do not think there is the least occasion to call in the aid of tidal or earthquake waves to account for any damage the ship would receive.

In the engine-room there was no shock felt, and the sailors and firemen say they did not notice anything unusual save only some passengers making a noise.

The masthead light was extinguished through the chimney being unshipped and falling across the wick.

Yours very truly,
W. WATSON.

Huskisson Dock, Liverpool, August 18.

THE GARDEN ROSES OF INDIA.

THE principal garden roses cultivated in Europe and in India may be traced to Western Asia and China. The old-fashioned summer roses, which were the ornament of gardens in Europe forty to fifty years ago, are mostly referred to *Rosa gallica*, which has its home in South Europe and Western Asia, and to *Rosa centifolia* and *damascena*, which probably came from the mountains of Armenia and Northern Persia. All these are distinguished by the incomparable delicacy of their aroma, and of the two last-named kinds one or the other is cultivated on a large scale in Southern France, Italy, Macedonia, Asia Minor, Persia, and Northern India, for rose-water and essence of roses (attar). The flowering season of these kinds is short, lasting a few weeks only, and it was an important event for horticulture when, towards the close of last century, the China roses were introduced in Europe. The most important of these was *Rosa indica*, thus called by Linnæus because it was brought from India, where it has long been grown in gardens. Its home, however, is not India, but China, and its great value consists in this, that it flowers throughout summer and autumn, hence the name autumnal rose, also monthly rose (*Monatsrose*). For this reason a variety was called *Rosa semperflorens*. Another variety, described under the name of *Rosa fragrans*, distinguished by its strong though not always very delicate scent, became the parent of the tea-roses. By crossing these kinds and other species with the old garden roses, the numberless varieties of hybrid perpetuals and tea-roses have been obtained, which now ornament our gardens in Europe as well as in India.

In India nine or ten species of roses are indigenous, but with the exception of *Rosa moschata*, a magnificent

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